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4. *Herpetomonas jaculum* and *Crithidia gerridis* have also been successfully fed or inoculated into cold-blooded hosts, namely, fishes (*Gasterosteus aculeatus*), frogs, toads, lizards (*Lacerta vivipara*) and grass-snakes (*Tropidonotus natrix*).

5. The disease induced may run an acute or a chronic course. In the acute cases among our vertebrates the flagellate form of the parasite was the more obvious at death. In chronic cases, non-flagellate forms of the parasite were more numerous.

6. Natural herpetomoniasis of a pigeon has been recorded by Drs. Edm. and Et. Sergent in Algeria. This affords a parallel case with the natural and induced herpetomoniasis of mice as recorded by us.

7. The flagellate stage of *Leishmania donovani* in vertebrates is now known, and that of *L. tropica* in man has been known for some time. The links completing the evidence that a *Leishmania* is morphologically a *Herpetomonas* are thus complete. We believe that leishmaniasis are invertebrate-borne herpetomoniasis, and that these maladies have been evolved from flagellates of invertebrates (especially herpetomonads of insects), which have been able to adapt themselves to life in vertebrates.

8. In areas where leishmaniasis are endemic an examination should be made of all insects and other invertebrates likely to come into contact with men or dogs or domestic vermin like rats and mice, in order to ascertain if these invertebrates harbor herpetomonads. Preventive measures should be directed against such invertebrates, especially arthropods. Further, it is likely that members of all classes of vertebrates, and especially those members that are insectivorous, may serve as reservoirs for leishmaniasis, or as they should preferably be termed, herpetomoniasis. The virus may exist in such reservoirs in a very attenuated condition and so be difficult of detection. From these sources the herpetomonads may reach man by the agency of ectoparasites or flies, especially such as are sanguivorous.

ADDENDUM

As this paper—the writing of which has been greatly delayed by war work—was on the point of being despatched, our attention was drawn to an article on The Insect Vector of Uta by C. H. T. Townsend in the December number of the *Journal of Parasitology*, just received in England. The concluding paragraph of the text and more particularly of the summary of Townsend's paper were read by us with very great interest, as they confirm our conclusions regarding leishmaniasis being arthropod-borne herpetomoniasis. This conclusion of ours has met with considerable opposition at the hands of Wenyon, much to our

surprise, and in spite of the fact that the experiments of Laveran and Franchini, as well as the much more extended series of our own, admit of no other conclusion to our mind.

The following conclusions of ours may be compared with those of Townsend (December, 1915). Thus, in November, 1914, we stated that, "It may be expected that the various leishmaniasis, occurring in different parts of the world, will prove to be insect-borne herpetomoniasis." Again, in May, 1915, we wrote that: "As we have previously stated, we believe that leishmaniasis are arthropod-borne herpetomoniasis, and that these maladies have been evolved from flagellates of invertebrates (especially herpetomonads of insects), which have been able to adapt themselves to life in vertebrates." Further, one of us in June, 1915, wrote that: "It is inferred that the various leishmaniasis are due to a herpetomonad of invertebrates which, under different conditions of environment, produces pathogenic effects in very varying degrees in different vertebrates, from zero, as in the mice described by Dutton and Todd in 1903, to high mortality as in Indian kala-azar, and probably zero again in cold-blooded hosts. It is also a flagellate which can probably live in invertebrates not already recorded as being infected. A human reservoir of leishmaniasis may occur in some places, while warm and cold-blooded vertebrates may also function as the same."

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